P/N 1088 | REV. D 06/25

NT® Pressure Transducer for Vacuum Applications

User Guide

Entegris

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Introduction

This manual is for use with NT® Pressure Transducers for vacuum applications, single-port and flow-through models 4150 and 4250. These instruments have been designed for use in high purity applications in the semiconductor industry and are compatible with highly corrosive processes.

These products feature no moving parts and no filled cavities, which reduces the possibility of a contaminated process. The wetted parts of these nonmetallic transducers are constructed with PTFE, sapphire or other similar high purity inert materials.

Ordering Information

CODE	BASE MODEL
4150	Single-Port Vacuum Pressure Transducer

CODE	PRESSURE RANGE
030N	-12 to 30 psig (-83 to 207 kPa)
060N	-12 to 60 psig (-83 to 414 kPa)
100N	-12 to 100 psig (-83 to 650 kPa)
030P	0 to 30 psig (0 to 207 kPa)
060P	0 to 60 psig (0 to 414 kPa)
100P	0 to 100 psig (0 to 690 kPa)

CODE	INLET/OUTLET PORT CONNECTION TYPE
F02	¼" Flaretek®
F03	⅜" Flaretek
F04	½" Flaretek
N02	¼" FNPT
N04	½" FNPT
M02	¼" MNPT

CODE	ELECTRICAL CONNECTOR TYPE
B06	FEP-jacketed 6' pigtail electrical cable
B12	FEP-jacketed 12' pigtail electrical cable
B30	FEP-jacketed 30' pigtail electrical cable
D00	3-pin polypropylene connector
D06	3-pin polypropylene connector and 6' PVC-jacketed mating cable
D12	3-pin polypropylene connector and 12' PVC-jacketed mating cable
D30	3-pin polypropylene connector and 30' PVC-jacketed mating cable

CODE	ELECTRICAL OUTPUTS
A	4-20 mA (12-28 VDC input)

CODE	PRIMARY/SECONDARY SEAL
U3	Perfrez PXC Ultra/Viton
S3	Perfrez PXC Ultra/Perfrez PXC Ultra

CODE	BASE MODEL
4250	Flow-Through Vacuum Pressure Transducer

CODE	PRESSURE RANGE
030N	-12 to 30 psig (-83 to 207 kPa)
060N	-12 to 60 psig (-83 to 414 kPa)
100N	-12 to 100 psig (-83 to 650 kPa)
030P	0 to 30 psig (0 to 207 kPa)
060P	0 to 60 psig (0 to 414 kPa)
100P	0 to 100 psig (0 to 690 kPa)

CODE	INLET/OUTLET PORT CONNECTION TYPE
F02	¼" Flaretek
F03	⅜" Flaretek
F04	½" Flaretek
F06	¾" Flaretek
F08	1" Flaretek (030G, 060G types only)

CODE	ELECTRICAL CONNECTOR TYPE
B06	FEP-jacketed 6' pigtail electrical cable
B12	FEP-jacketed 12' pigtail electrical cable
B30	FEP-jacketed 30' pigtail electrical cable
D00	3-pin polypropylene connector
D06	3-pin polypropylene connector and 6' PVC-jacketed mating cable
D12	3-pin polypropylene connector and 12' PVC-jacketed mating cable
D30	3-pin polypropylene connector and 30' PVC-jacketed mating cable

CODE	ELECTRICAL OUTPUTS
A	4-20 mA (12-28 VDC input)

CODE	PRIMARY/SECONDARY SEAL
U3	Perfrez PXC Ultra/Viton
S3	Perfrez PXC Ultra/Perfrez PXC Ultra

IDENTIFYING NONSTANDARD PRODUCT CONFIGURATIONS

This User Guide applies to product manufactured as standard NT Pressure Transducers single-port and flow-through models 4150 and 4250. Entegris also manufactures nonstandard product to meet the needs of specific applications. Nonstandard product may have different materials of construction, accuracy specifications, performance and other specifications that differentiate the nonstandard product from the standard offering.

NOTE: Nonstandard pressure transducers may be identified by the model number found on the product label.

Nonstandard **single-port pressure transducers**, model 4150 product line, are identified with a "P" followed by a number code.

For example, part number
4150-030N-F02-B06-A-**P04**
the "P04" designates the product as a nonstandard product manufactured to certain specifications designated under the "P04" code.

Nonstandard **flow-through pressure transducers**, model 4250 product line, are identified with a "T" followed by a number code.

For example, part number
4250-030N-F02-B06-A-**T02**
the "T02" designates the product as a nonstandard product manufactured to certain specifications designated under the "T02" code.

Installation

CAUTION! The NT Pressure Transducer has been factory sealed. Do not attempt to remove the coverof the pressure transducer. Any attempt at removal of the pressure transducer cover will void the warranty and damage the unit.

CAUTION! Do not tighten the nuts that protect the process connections during shipment. Do not tighten the nuts unless the proper tubing has been installed. Tightening these nuts may result in damage to the pressure transducer process connections.

MECHANICAL INSTALLATION

NT Pressure Transducers utilize Flaretek® flared tube connections and must be used with the proper tubing size and coupling nut.

When installing flared tubing to the pressure transducer, the flared tube is pushed over the transducer's fitting until the fitting reaches the smaller tube diameter. The amount of torque required to tighten the coupling nut is dependent upon the size of the fitting.

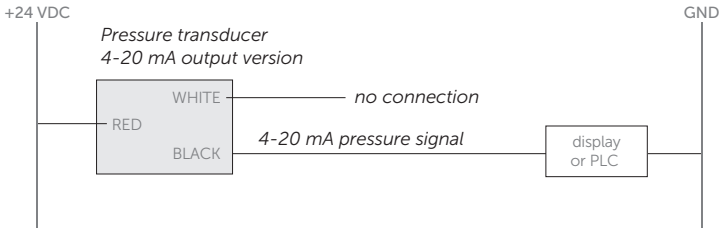
Fitting size	¼"	⅜"	½"	¾"	1"
Torque (in•lb)	5	8	11	14	30

Care should be taken when installing flared tubing onto the pressure transducer. Do not use excessive torque or subject the transducer to high heat during installation. The transducer should be firmly mounted to a solid surface to ensure stability. Verify that the pressure transducer and the signal cable are free from mechanical stress or excessive bending from the surrounding equipment.

ELECTRICAL INSTALLATION

The pressure transducer provides an analog (4-20 mA) electrical output proportional to the pressure measured.

NOTE: The white wire is not required, please refer to the wiring diagram below.



POWER SUPPLY REQUIREMENTS

The pressure transducer requires a 12-28 volt DC power supply with less than 2% ripple at 100 or 120 Hz. The required power supply voltage varies with the load resistance (RLoad), please refer to the diagrams below and the formulas on page 9.

The power supply must provide clean power and must be used only to power similar measurement-type devices. The power supply must not be used to power inductive loads, such as motors, relays or solenoids. These devices may produce transients that may affect the pressure transducer measurements when the inductive device is powered-up or powered down.

NOTE: Be sure to ground the shield of the cable to local ground.

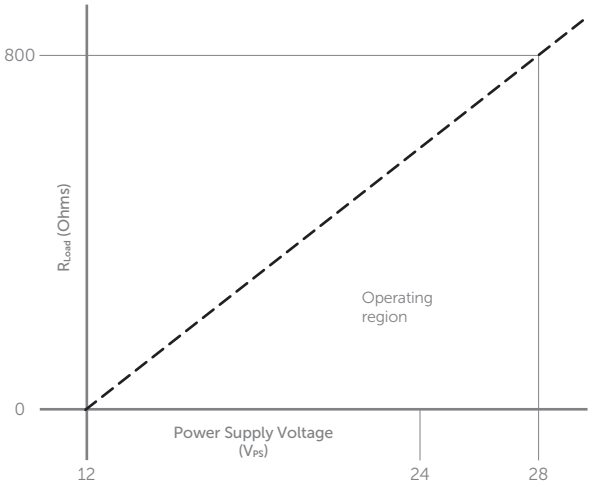


Figure 1. Power Required for a 4-20 mA Loop

LOAD RESISTANCE: CURRENT OUTPUT

(4-20 mA Configuration)

If a load resistor, R_{Load}, is used in series with the current output, the value of R_{Load} is dependent on the supply voltage and the meter resistance and is calculated from the following formula.

$$R_{Load} = \frac{V_{PS} - 12\ V}{0.020A} - (R_{meter} + R_{wire})$$

where:

R_{Load} = maximum load resistance (ohms)

V_{PS} = power supply voltage (volts)

R_{meter} = meter resistance (ohms) (typically not used, therefore $R_{meter} = 0$)

R_{wire} = resistance of interconnecting wire

Unit Operation

OPERATING ENVIRONMENT

The pressure transducer is to be mounted in a well vented and controlled environment. Refer to the Reference section on page 13 for additional specifications.

PROCESS CONNECTIONS

To avoid possible pressure leaks, make sure all process connections have been performed in accordance with the Mechanical Installation guidelines on page 6.

PRESSURE TRANSDUCER COVER ASSEMBLY

NT Pressure Transducer covers are factory sealed and should not be tampered with or opened. Opening the cover shall void the product warranty.

NOTE: Any attempt to remove or tamper with the transducer cover will void the warranty and damage the unit.

TEMPERATURE REQUIREMENTS

The pressure transducer is rated for use with fluids at process temperatures between 10° to 35°C (50° to 95°F) under normal operating conditions.

PRESSURE LIMITS

TRANSDUCER RANGE	MAX. PRESSURE LIMIT @ 23°C (73°F)
-12 to 30 psig (-83 to 207 kPa)	45 psig (310 kPa)
-12 to 60 psig (-83 to 414 kPa)	90 psig (621 kPa)
-12 to 100 psig (-83 to 690 kPa)	150 psig (1034 kPa)

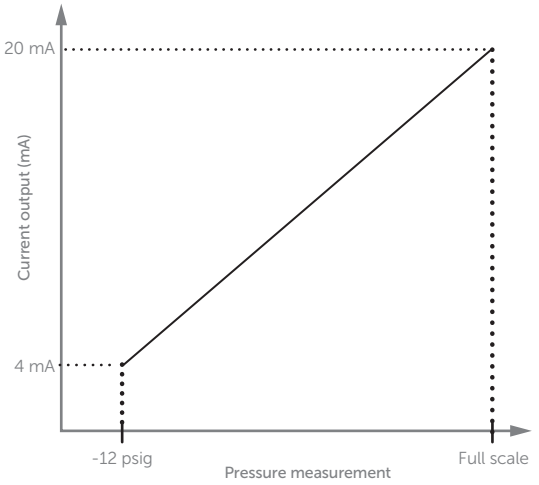
WARNING! The pressure limits for NT Pressure Transducers models 4150 and 4250 decrease significantly for temperatures above 35°C (95°F) Please consult the factory.

PRESSURE REFERENCE ACCURACY

The accuracy of the pressure transducer output is ±1% of span. For example, a -12 to 30 psig ranged pressure transducer has a span of 42 psig and an accuracy of ±0.42 psig. This accuracy includes the effects of linearity, hysteresis and repeatability, measured at room temperature.

LINEAR OUTPUT SIGNAL

The output signal of the NT Pressure Transducer is a linear function proportional to the applied pressure.



Troubleshooting

Troubleshooting the NT Pressure Transducers may be accomplished by measuring the output signal of the pressure transducer with a battery powered current/voltage meter. The meter may be placed in series with the pressure transducer to measure the current output or it may be used to directly measure the voltage output.

Using the battery powered current/volt meter is an effective method to determine whether the device or the on-site data acquisition system is not functioning properly.

Reference

The following lists the specifications for NT Pressure Transducers, models 4150 and 4250. Consult the factory for product specifications manufactured for nonstandard applications.

NOTE: Specifications are subject to change without notice. Please consult the factory for the most current information.

PHYSICAL SPECIFICATIONS

CONSTRUCTION MATERIALS		
Wetted parts		
	Body:	PTFE
	Sensor interface:	Sapphire
	O-ring:	Kalrez 4079, Kalrez 1050 or Perfrez PXC Ultra
Nonwetted parts		Polypropylene, polyethylene and PVDF (In addition to materials listed above)
Connection type		Flaretek

ELECTRICAL SPECIFICATIONS

Input power	24 VDC (12-28 VDC)
Pressure signal output ranges	4-20 mA
Electrical connection	6', 12', 30' FEP-coated pigtail or polypropylene 3-pin connector with PVC cable

PERFORMANCE SPECIFICATIONS

Reference accuracy	±1% of span (includes linearity, hysteresis and repeatability) at 23°C (73°F)
Process temperature	10° to 35°C (50° to 95°F)

Certifications

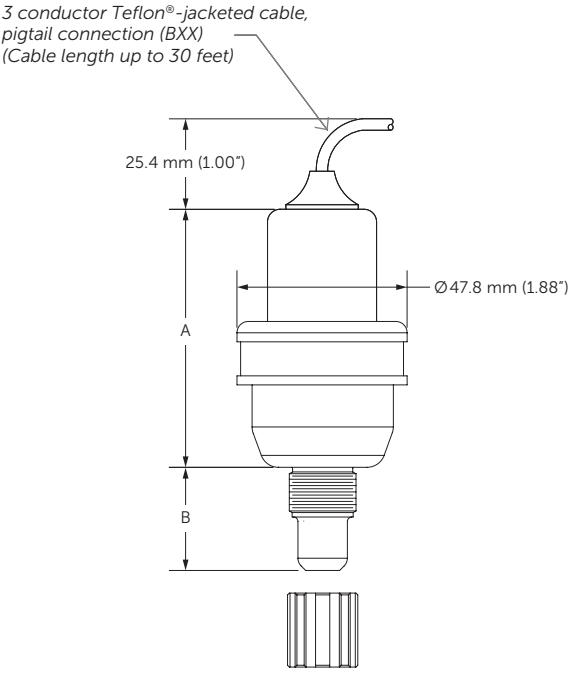
CE COMPLIANCE

Entegris products have been tested to various test standards required by the EMC 89/336/EEC directive. The results of this testing are on file at Entegris and are available upon request.

Please contact the factory for the latest information. The most current specifications may be found on the Internet at: http://www.nt-intl.com/ce_etl-info.cfm.

Installation Drawings

4150 FEP-Jacketed Electrical Cable Connection, Single-Port

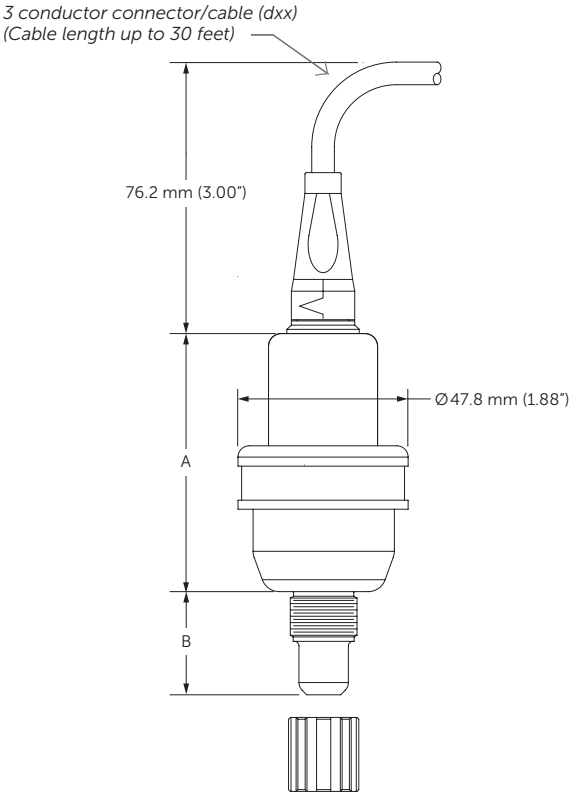


Electrical Connector Information

WIRE	4-20 mA OUTPUT VERSION
Red	24 VDC (+) 4-20 mA
Black	Ground (-) 4-20 mA
White	Not used

INLET/OUTLET PORT CONNECTION	A	B
¼" Flaretek	73.7 mm (2.90")	25.2 mm (0.99")
⅜" Flaretek	73.7 mm (2.90")	26.9 mm (1.06")
½" Flaretek	73.7 mm (2.90")	29.0 mm (1.14")

4150 Polypropylene Connector Connection, Single-Port

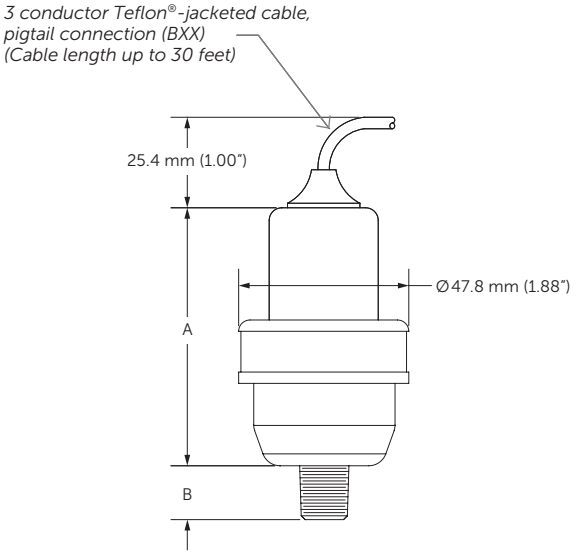


Electrical Connector Information

WIRE	4-20 mA OUTPUT VERSION
Black	Ground (-) 4-20 mA
Red	24 VDC (+) 4-20 mA
White	Not used

INLET/OUTLET PORT CONNECTION	A	B
¼" Flaretek	73.7 mm (2.90")	25.2 mm (0.99")
⅜" Flaretek	73.7 mm (2.90")	26.9 mm (1.06")
½" Flaretek	73.7 mm (2.90")	29.0 mm (1.14")

4150 FEP-Jacketed Electrical Cable Connection, Single-Port (NPT version)

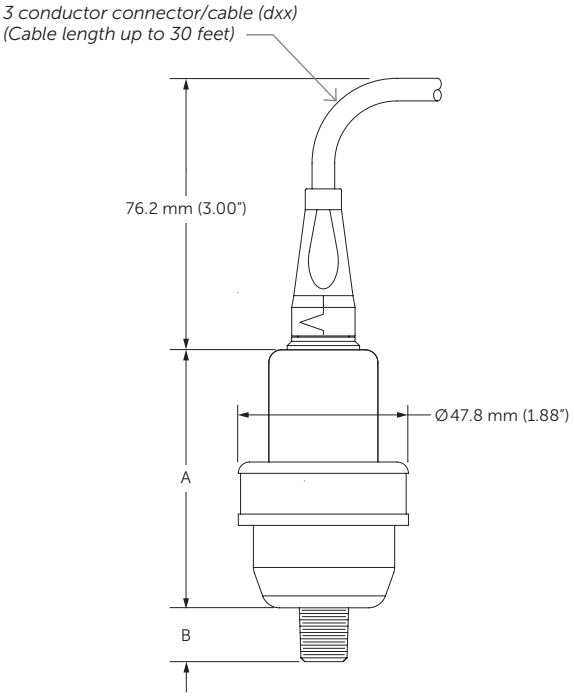


Electrical Connector Information

WIRE	4-20 mA OUTPUT VERSION
Red	24 VDC (+) 4-20 mA
Black	Ground (-) 4-20 mA
White	Not used

INLET/OUTLET PORT CONNECTION	A	B
¼" MNPT MALE	73.7 mm (2.90")	15.0 mm (0.59")
¼" FNPT FEMALE	82.3 mm (3.24")	–
½" FNPT FEMALE	88.9 mm (3.50")	–

4150 FEP-Jacketed Electrical Cable Connection, Single-Port (NPT version)

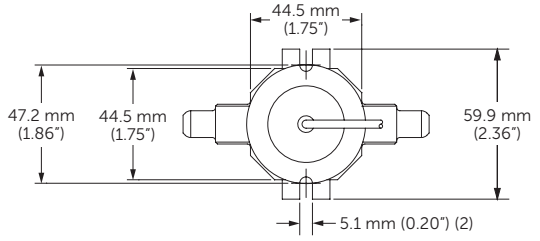


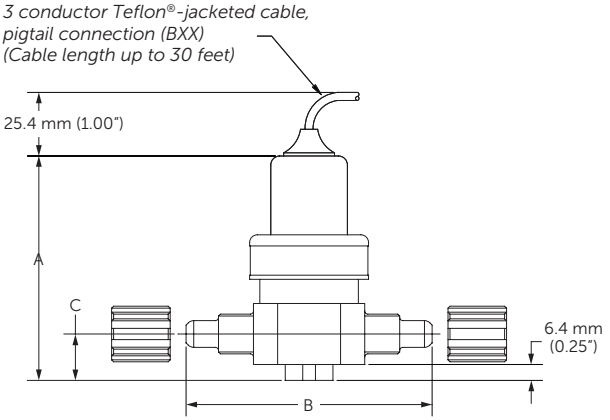
Electrical Connector Information

WIRE	4-20 mA OUTPUT VERSION
Black	Ground (-) 4-20 mA
Red	24 VDC (+) 4-20 mA
White	Not used

INLET/OUTLET PORT CONNECTION	A	B
¼" MNPT MALE	73.7 mm (2.90")	15.0 mm (0.59")
¼" FNPT FEMALE	78.0 mm (3.07")	–
½" FNPT FEMALE	84.6 mm (3.33")	–

4250 FEP-Jacketed Electrical Cable Connection, Flow-Through



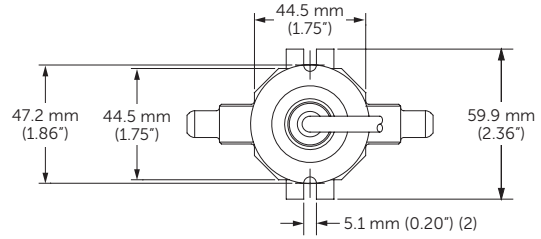


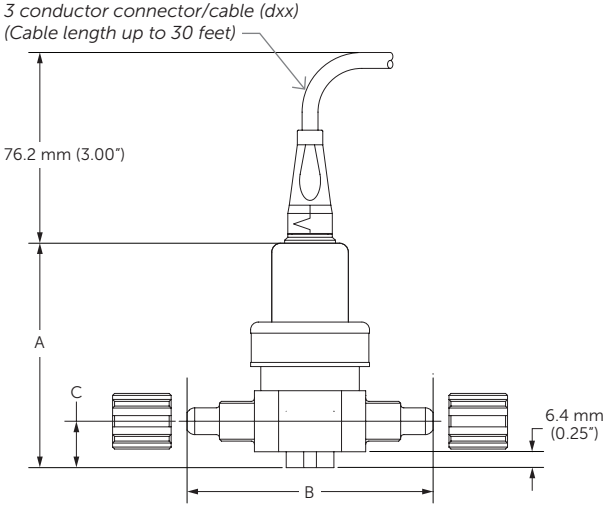
Electrical Connector Information

WIRE	4-20 mA OUTPUT VERSION
Red	24 VDC (+) 4-20 mA
Black	Ground (-) 4-20 mA
White	Not used

INLET/OUTLET PORT CONNECTION	A	B	C
¼" Flaretek	89.7 mm (3.53")	94.5 mm (3.72")	18.5 mm (0.73")
⅜" Flaretek	89.7 mm (3.53")	98.3 mm (3.87")	17.0 mm (0.67")
½" Flaretek	96.0 mm (3.78")	102.4 mm (4.03")	21.6 mm (0.85")
¾" Flaretek	104.4 mm (4.11")	108.5 mm (4.27")	25.4 mm (1.00")
1" Flaretek	112.5 mm (4.43")	120.7 mm (4.75")	30.5 mm (1.20")

4250 Polypropylene Connector Connection, Flow-Through





Electrical Connector Information

WIRE	4-20 mA OUTPUT VERSION
Red	24 VDC (+) 4-20 mA
Black	Ground (-) 4-20 mA
White	Not used

INLET/OUTLET PORT CONNECTION	A	B	C
¼" Flaretek	89.7 mm (3.53")	94.5 mm (3.72")	18.5 mm (0.73")
⅜" Flaretek	89.7 mm (3.53")	98.3 mm (3.87")	17.0 mm (0.67")
½" Flaretek	96.0 mm (3.78")	102.4 mm (4.03")	21.6 mm (0.85")
¾" Flaretek	104.4 mm (4.11")	108.5 mm (4.27")	25.4 mm (1.00")
1" Flaretek	112.5 mm (4.43")	120.7 mm (4.75")	30.5 mm (1.20")

FOR MORE INFORMATION

Please call your Regional Customer Service Center today to learn what Entegris can do for you. Visit entegris.com and select the Contact Us link to find the customer service center nearest you.

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